

## WE CLAIM:

1. Edible plant material comprising transgenic plant cells transformed with a resveratrol synthase transgene under the control of a constitutive promoter whereby said transgenic plant cells accumulate resveratrol glucoside upon expression of said resveratrol synthase transgene, wherein said edible plant material exhibits an increased concentration of resveratrol glucoside at the time of consumption as compared to edible plant material consisting of non-transgenic plant cells of the same cell type grown under the same conditions.
2. The edible plant material of Claim 1, wherein said edible plant material is suitable for consumption as a food stuff, a nutritional supplement, an animal feed supplement, or a nutraceutical in the form of a live or harvested whole plant or plant part.
3. The edible plant material of Claim 1, wherein said resveratrol synthase transgene is SEQ ID NO:2.
4. The edible plant material of Claim 2, wherein said resveratrol synthase transgene is SEQ ID NO:2.
5. The edible plant material of Claim 1, 2, 3 or 4, wherein said plant is a legume.
6. The edible plant material of Claim 5, wherein said plant is alfalfa.
7. The edible plant material of Claim 5, wherein said plant is soybean.
8. A composition comprising edible plant material, said edible plant material comprising transgenic plant cells transformed with a resveratrol synthase transgene under the control of a constitutive promoter whereby said transgenic plant cells accumulate resveratrol glucoside upon expression of said resveratrol synthase transgene, wherein the percentage of resveratrol glucoside in said composition obtained by adding a given weight of said edible plant material comprising said transgenic plant cells to said composition is higher than the percentage of resveratrol glucoside obtainable by adding instead the same weight of edible plant material consisting of non-transgenic plant cells of the same cell type grown under the same conditions to said composition.
9. The composition of Claim 8, wherein said composition is suitable for consumption as a food stuff, a nutritional supplement, an animal feed supplement, or a nutraceutical.

10. The composition of Claim 8, wherein said resveratrol synthase transgene is SEQ ID NO:2.

11. The composition of Claim 9, wherein said resveratrol synthase transgene is SEQ ID NO:2.

12. The composition of Claim 8, 9, 10 or 11, wherein said plant is a legume.

13. The composition of Claim 12, wherein said plant is alfalfa.

14. The composition of Claim 12, wherein said plant is soybean.

5 15. An edible plant comprising transgenic plant cells transformed with a resveratrol synthase transgene under the control of a constitutive promoter whereby said transgenic plant cells accumulate resveratrol glucoside upon expression of said resveratrol synthase transgene, wherein said edible plant exhibits an increased concentration of resveratrol glucoside at the time of consumption as compared to an edible plant comprising non-transgenic plant cells of the same cell type grown under the same conditions.

16. The edible plant of Claim 15, wherein said edible plant is suitable for consumption as a food stuff, a nutritional supplement, an animal feed supplement, or a nutraceutical in the form of a live or harvested whole plant or a plant part.

17. The edible plant of Claim 15, wherein said resveratrol synthase transgene is SEQ ID NO:2.

18. The edible plant of Claim 16, wherein said resveratrol synthase transgene is SEQ ID NO:2.

19. The edible plant of Claim 15, wherein said resveratrol synthase transgene comprises at least one recombinant DNA sequence.

20. The edible plant of Claim 16, wherein said resveratrol synthase transgene comprises at least one recombinant DNA sequence.

21. The edible plant of Claim 15, 16, 17, 18, 19 or 20, wherein said plant is a legume.

22. The edible plant of Claim 21, wherein said plant is alfalfa.

23. The edible plant of Claim 21, wherein said plant is soybean.

24. Seed from the edible plant of Claim 15, 16, 17, 18, 19, 20, 21, 22 or 23.

25. Progeny from the edible plant of Claim 15, 16, 17, 18, 19, 20, 21, 22 or 23.

26. Progeny from the seed of Claim 24.

27. A method of improving the nutritional value of an edible plant comprising:  
transforming cells from said plant with a DNA construct comprising at least one  
open reading frame encoding for resveratrol synthase under expression control of a  
constitutive promoter to form transgenic plant cells; and

5 cultivating said transgenic plant cell under conditions conducive to regeneration  
and plant growth and under conditions conducive to the accumulation of p-coumaryl CoA  
and malonyl CoA precursors and the suppression of  $\beta$ -glucosidases,

10 wherein said edible plant exhibits an increased concentration of resveratrol  
glucoside at the time of consumption as compared to an edible plant comprising non-  
transgenic plant cells of the same cell type grown under the same conditions.

28. The method of Claim 27, wherein said open reading frame is SEQ ID NO:2.

29. A method of using an edible plant comprising transgenic plant cells  
transformed with a resveratrol synthase transgene under the control of a constitutive  
promoter whereby said transgenic plant cells accumulate resveratrol glucoside upon  
expression of said resveratrol synthase transgene, wherein said edible plant exhibits an  
5 increased concentration of resveratrol glucoside at the time of consumption as compared  
to an edible plant comprising non-transgenic plant cells of the same cell type grown  
under the same conditions to provide a nutraceutical benefit to a human or animal.

30. The method of Claim 29, wherein said open reading frame is SEQ ID NO:2.

31. A method for producing isolated resveratrol glucoside comprising  
transforming a non-transgenic plant cell with a DNA construct comprising at least  
one open reading frame encoding for resveratrol synthase under expression control of a  
constitutive promoter to form said transgenic plant cell; and

5 cultivating said transgenic plant cell under conditions conducive to regeneration  
and plant growth and under conditions conducive to the accumulation of p-coumaryl CoA  
and malonyl CoA precursors and the suppression of  $\beta$ -glucosidases, wherein said  
transgenic plant cell exhibits an increased concentration of resveratrol glucoside as

compared to non-transgenic plant cells of the same cell type grown under the same  
10 conditions; and

isolating said resveratrol glucoside from said transgenic plant cell.

32. The method of Claim 31, wherein said open reading frame is SEQ ID NO:2.

33. The method of Claim 31 or 32, wherein said isolated resveratrol glucoside is  
suitable for consumption as a nutritional supplement, an animal feed supplement, or a  
nutraceutical.

34. A method for producing a transgenic plant cell having increased resveratrol  
glucoside concentration comprising

transforming a non-transgenic plant cell with a DNA construct comprising at least  
one open reading frame encoding for resveratrol synthase under expression control of a  
5 constitutive promoter to form said transgenic plant cell; and

cultivating said transgenic plant cell under conditions conducive to regeneration  
and plant growth and under conditions conducive to the accumulation of p-coumaroyl CoA  
and malonyl CoA precursors and the suppression of  $\beta$ -glucosidases,

wherein said transgenic plant cell exhibits an increased concentration of  
10 resveratrol glucoside as compared to non-transgenic plant cells of the same cell type  
grown under the same conditions.

35. The method of Claim 34, wherein said open reading frame is SEQ ID NO:2.

36. The method of Claim 34 or 35, wherein said plant is a legume.

37. The method of Claim 36, wherein said plant is alfalfa.

38. The method of Claim 36, wherein said plant is soybean.

39. A method of increasing disease resistance in an edible plant comprising  
transforming cells of said plant with a resveratrol synthase transgene under the control of  
a constitutive promoter whereby said transgenic plant cells accumulate resveratrol  
glucoside upon expression of said resveratrol synthase transgene, wherein said edible  
5 plant exhibits an increased concentration of resveratrol glucoside at the time of  
consumption as compared to an edible plant comprising non-transgenic plant cells of the  
same cell type grown under the same conditions.

40. The method of Claim 39, wherein said open reading frame is SEQ ID NO:2.

41. A method for decreasing spoilage of an edible plant or plant parts after harvesting comprising

before harvesting, transforming cells from said plant with a DNA construct comprising at least one open reading frame encoding for resveratrol synthase under expression control of a constitutive promoter to form transgenic plant cells; and

cultivating said transgenic plant cell under conditions conducive to regeneration and plant growth and under conditions conducive to the accumulation of p-coumaroyl CoA and malonyl CoA precursors and the suppression of  $\beta$ -glucosidases, wherein resveratrol glucoside accumulates in said transgenic plant cells,

whereupon harvesting, said plant exhibits an increased concentration of resveratrol glucoside as compared to a plant comprising non-transgenic plant cells of the same cell type grown under the same conditions.

42. The method of Claim 41, wherein said open reading frame is SEQ ID NO:2.

43. Use of a plant material for the manufacture of a nutraceutical composition, said plant material comprising transgenic plant cells transformed with a resveratrol synthase transgene under the control of a constitutive promoter whereby said transgenic plant cells accumulate resveratrol glucoside upon expression of said resveratrol synthase transgene, and wherein said plant material exhibits an increased concentration of resveratrol glucoside at the time of manufacture as compared to plant material comprising non-transgenic plant cells of the same cell type grown under the same conditions.

44. The use of Claim 43, wherein said resveratrol synthase transgene is SEQ ID NO:2.

45. The use of Claim 43 or 44, wherein said plant is a legume.

46. The use of Claim 45, wherein said plant is alfalfa.

47. The use of Claim 45, wherein said plant is soybean.

48. Use of a plant material for the manufacture of a nutritional supplement, said plant material comprising transgenic plant cells transformed with a resveratrol synthase transgene under the control of a constitutive promoter whereby said transgenic plant cells accumulate resveratrol glucoside upon expression of said resveratrol synthase transgene, and wherein said plant material exhibits an increased concentration of resveratrol

glucoside at the time of manufacture as compared to plant material comprising non-transgenic plant cells of the same cell type grown under the same conditions.

49. The use of Claim 48, wherein said resveratrol synthase transgene is SEQ ID NO:2.

50. The use of Claim 48 or 49, wherein said plant is a legume.

51. The use of Claim 50, wherein said plant is alfalfa.

52. The use of Claim 50, wherein said plant is soybean.

53. Use of an edible plant material for the manufacture of a food stuff, said edible plant material comprising transgenic plant cells transformed with a resveratrol synthase transgene under the control of a constitutive promoter whereby said transgenic plant cells accumulate resveratrol glucoside upon expression of said resveratrol synthase transgene, and wherein said edible plant material exhibits an increased concentration of resveratrol glucoside at the time of manufacture as compared to edible plant material comprising non-transgenic plant cells of the same cell type grown under the same conditions.

54. The use of Claim 53, wherein said resveratrol synthase transgene is SEQ ID NO:2.

55. The use of Claim 53 or 54, wherein said plant is a legume.

56. The use of Claim 55, wherein said plant is alfalfa.

57. The use of Claim 55, wherein said plant is soybean.